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DOE/RL-2002-64
Revision 2

Radioactive Air Emissions Notice of Construction for Transition of the 232-Z Contaminated Waste Recovery Process Facility at the Plutonium Finishing Plant, 200 West Area, Hanford Site, Richland, Washington

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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April 2004

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TERMS

ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
CAM	continuous air monitor
CFR	Code of Federal Regulations
Ci	curie
DOE-RL	U.S. Department of Energy, Richland Operations Office
dpm	disintegrations per minute
EPA	U.S. Environmental Protection Agency
HEPA	high efficiency particulate air (filter)
HPT	health physics technician
LIGO	Laser Inferometer Gravitational Wave Observatory
MEI	maximally exposed individual
MPR	maximum public receptor
mrem	millirem
NDA	nondestructive analysis
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	notice of construction
PCM	periodic confirmatory measurements
PFP	Plutonium Finishing Plant
PTRAEU	portable temporary radioactive air emissions unit
SEPA	*State Environmental Policy Act of 1971*
TEDE	total effective dose equivalent
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1993, Professional Publications, Inc., Belmont, California.

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR TRANSITION OF THE 232-Z CONTAMINATED WASTE RECOVERY PROCESS FACILITY AT THE PLUTONIUM FINISHING PLANT, 200 WEST AREA, HANFORD SITE, RICHLAND, WASHINGTON

This document serves as a notice of construction (NOC) pursuant to the requirements of Washington Administrative Code (WAC) 246-247-060 for transition of the 232-Z Contaminated Waste Recovery Process Facility (232-Z Building) at the Plutonium Finishing Plant.

The 232-Z Building was designed and built during the late 1950s and early 1960s to house a combustible waste incinerator known as the Contaminated Waste Recovery Process Facility. From 1961 until 1972, the 232-Z Building was used to recover plutonium through incineration of plutonium-contaminated combustible scrap materials. Since 1994, the 232-Z Building has been in a safe and stable surveillance and maintenance mode.

Revision 0 of DOE/RL-2002-64 was submitted to the State of Washington Department of Health (WDOH) in November 2002. Revision 1, providing additional detail of activities, was submitted to WDOH in May 2003 approved AIR 03-902, September 2003). This revision (Revision 2) has been prepared to correct earlier revisions based on more recent data gathered regarding potential inventory in the building which could contribute to the calculated potential-to-emit.

The estimated potential total effective dose equivalent (TEDE) to the maximally exposed individual (MEI) resulting from the unabated emissions from transition of the 232-Z Building is 7.6 E+00 millirem per year. The calculated abated TEDE is 2.2 E-02 millirem per year.

1.0 LOCATION

Name and address of the facility, and location (latitude and longitude) of the emission unit:

The 232-Z Building is located in the 200 West Area (Figure 1). The address and geodetic coordinates for the 232-Z Building are as follows:

U.S. Department of Energy, Richland Operations Office (DOE-RL)
Hanford Site
Richland, Washington 99352
200 West Area, PFP, 232-Z Building

46° 33" North Latitude
119° 37" West Longitude

2.0 RESPONSIBLE MANAGER

Name, title, address and phone number of the responsible manager:

Mr. Matthew S. McCormick, Assistant Manager for Central Plateau
U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, Washington 99352
(509) 373-9971

3.0 PROPOSED ACTION

Identify the type of proposed action for which this application is submitted.

The proposed action is to transition the 232-Z Building; no future mission has been identified. The existing ventilation system, with a discharge through the 296-Z-14 Stack, would be operational during all deactivation activities conducted inside the 232-Z Building. After physical deactivation activities within the structure have been completed, the ventilation system would be shut down. The planned activities do not represent a "significant modification" per WAC 246-247 (i.e., the anticipated emissions associated with these activities are calculated to result in a potential-to-emit of less than 1.0 millirem per year). However, the planned actions are a modification to an existing unit.

4.0 STATE ENVIRONMENTAL POLICY ACT

If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

The proposed action categorically is exempt from the requirements of SEPA under WAC 197-11-845.

5.0 PROCESS DESCRIPTION

Describe the chemical and physical processes upstream of the emission unit.

Descriptions of the 232-Z Building and associated deactivation activities are provided in the following sections.

5.1 FACILITY DESCRIPTION

The 232-Z Building was designed and built during the late 1950s and early 1960s to house a combustible waste incinerator known as the Contaminated Waste Recovery Process Facility. From 1961 until 1972, the 232-Z Building was used to recover plutonium through incineration of plutonium-contaminated combustible scrap materials brought into the facility. A simple floor plan is shown in Figure 2.

Offgases produced from combustion were routed to scrubber equipment and a filter system located in the scrubber cell. The gases exited the scrubber cell and passed through high-efficiency particulate air (HEPA) filterboxes before exiting the building through underground ductwork. Gases originally were routed through the 291-Z-1 exhaust stack in the 291-Z Facility; but in 1990, a new, independent ventilation system was installed inside and along the outside east wall of the 232-Z Building (Figure 3).

Two installed fans, with a nominal rated capacity of 2,000 cubic feet per minute each, provide exhaust for the 232-Z Building and discharge to the atmosphere through the 296-Z-14 Stack. This stack is 21 feet high with a 12-inch diameter and is constructed of stainless steel. Exhaust effluents are sampled and monitored. Either exhaust fan can provide the required ventilation with the second fan on standby. The exhaust system has two-stage testable HEPA filtration (not counting the existing floor filters) and allows filter changeout of either filter without interrupting ventilation service. Redundancy is provided by having three separate banks. Any two banks are generally be in service to filter the required air with the third as a standby.

The 232-Z Building was closed in 1973 by the U.S. Department of Energy. A deactivation activity was initiated in 1984 and resulted in the removal of three large gloveboxes. A separate activity in the early 1990's resulted in removal of approximately 600 grams of residual plutonium from 232-Z Building ducting, process piping, and process equipment. During that activity, process equipment, fire brick lining and portions of ductwork were removed. HEPA filters were removed (and replaced) from filter boxes and filter boxes were cleaned. The bulk of the interior surfaces of the 232-Z Building has been painted resulting in predominantly fixed radiological contamination. Since 1994, the 232-Z Building has been in a safe and stable surveillance and maintenance mode, awaiting a decision to proceed with facility transition.

Recent deactivation activities, conducted under WDOH approval (AIR 03-902) of DOE/RL-2002-64, Revision 1, included additional characterization using nondestructive analysis (NDA). The most recent NDA indicated in excess of 1 kilogram of material within the structure.

5.2 DEACTIVATION ACTIVITIES

The proposed action is to transition the 232-Z Building for dismantlement. All work would be performed in accordance with the approved radiological control procedures and as low as reasonably achievable (ALARA) program requirements [identified in *Occupational Radiation Protection Final Rule* (10 CFR 835)], as implemented by the project radiological manual, as amended. These requirements would be carried out through the activity work packages and associated radiological work permits.

The proposed transition activities involve essentially the same material handling and deactivation methods as the work conducted in the mid-1990s as described in Section 5.1. The proposed transition activities include the following:

- Remove residual plutonium from gloveboxes, filterboxes, equipment, piping, ductwork, and the building surfaces and package for disposition to onsite or offsite disposal facilities

- Remove internal equipment from gloveboxes and building equipment/system components and package for disposition to onsite or offsite disposal facilities

- Decontaminate gloveboxes, filterboxes, ductwork, and equipment to less than transuranic levels if possible

- Remove gloveboxes, filterboxes, ductwork, and equipment and package for disposition to onsite or offsite disposal facilities

- Decontaminate or fix contamination on building interior and exterior

- Disconnect utilities and services not necessary for monitoring

- Perform radiological and chemical characterization in preparation for dismantlement.

In preparation for the proposed transition activities, housekeeping, assays, preventive maintenance, minor decontamination, and reactivation of glovebox access ports would occur.

The proposed methods for removing residual contamination from equipment/systems and for removing equipment would be similar to methods in use today throughout the industry and the DOE Complex. Both direct contact and remote technologies/techniques could be used. These would include laboratory analyses and nondestructive assay; chemical cleaning, brushing, washing, scrubbing, vacuum cleaning, and abrasive jetting; using nibblers, shears, circular saws; and potentially a remote-operated laser. More specifically, the activities include the following.

- Size reduction of equipment will be by mechanical means and may be accomplished by compaction, disassembling by use of wrenches, nibblers, shears, cutters, grinders, saws, or other similar methods. This equipment may be manually, hydraulically, pneumatically or electrically powered.

- Decontamination methods include: Scrapping, sweeping, chemical cleaning, brushing, washing, scrubbing, scabbling, grinding, vacuum cleaning, strippable coatings, washing using wet rags, spraying, abrasive jetting, low pressure and high pressure wash using water and/or chemicals cleaners, use of fixatives and/or physically removal of contamination by use of mechanical means such as chipping or cutting. The application of fixatives for contamination control would be accomplished via aerosol fogging, paint brush/roller, hand-held spray bottle, or an electric or pneumatic powered sprayer.

- Containment of waste may be accomplished by coating the material with a fixative or placing the material in containers, bags and/or wrapping in plastic sheeting, utilizing adhesive tape, heat sealing or mechanical closure to prevent.

- Miscellaneous mechanical processes that could be used to support the proposed activity could include threading of piping, use of hot taps on piping, capping and plugging piping using threaded pipe components and expanding/compressive plugs or caps, drilling of holes in metal and concrete, core drilling concrete surfaces, installation of anchor bolts, installation and removal of bolts, installations of hose and tubing connectors, compression fittings, installation and removal of pumps, agitators and filters.

The inactive section of the 232-Z Building duct located in the 291-Z Building (Figure 4) would be blanked off. Underground ductwork between the 232-Z Building and the 291-Z Building would be characterized (e.g., remotely using a pipe crawler) for residual contamination and structural integrity; appropriate mitigation actions could be applied pending final disposition (i.e., decontamination, in situ stabilization).

Minor amounts of excavation might take place in the vicinity of the 232-Z Building to support site stabilization and isolating/blanking utilities. Access to underground piping and cable would be gained by use of a bucket-type excavator. Manual digging methods with shovels, picks, and rakes also could be used. Up to approximately 84 cubic meters of soil could be disturbed. Contaminated soil removed during excavation activities would be covered until replaced into the excavation or otherwise dispositioned (backfill would consist of the original material removed or 'clean' soil).

If needed or chosen for use during these activities, the categorical NOCs for sitewide use of the guzzler, a portable temporary radioactive air emissions unit (PTRAEU) exhauster, or HEPA filtered vacuum radioactive air emission unit could be used.

Wastes generated during deactivation would be packaged appropriately and transported in closed containers which meet established waste acceptance criteria to approved onsite locations/facilities pending final disposition.

5.3 DE-ENERGIZATION OF VENTILATION SYSTEM

After deactivation activities addressed in Section 5.2 have been completed, the ventilation system would be de-energized. A monitoring plan, if applicable, may be prepared identifying specific monitoring requirements based on final characterization and end state of the structure. The monitoring plan would be submitted to WDOH for review before shutdown of the 296-Z-14 Stack.

6.0 PROPOSED CONTROLS

Describe the existing and proposed abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate in cubic meters/second for the emission unit.

Many of the emission controls used during the deactivation activities are administrative, based on ALARA principles and consist of ALARA techniques. It is proposed that these controls satisfy as low as reasonably achievable control technology (ALARACT) for deactivation of the 232-Z Building. The transition operations would be performed in accordance with the controls specified in a radiation work permit (RWP) and/or operating procedures, available for inspection upon request. These controls consist of the following.

1. Health physics technician (HPT) coverage would be provided, as necessary, during all deactivation and excavation activities.

2. The existing ventilation system for the 232-Z Building (Figure 3), exhausting through the 296-Z-14 Stack, would be operational during transition activities.

3. The existing monitoring system for the 296-Z-14 Stack (Figure 5) would be operational during transition activities.

4. Appropriate controls such as water, fixatives, covers, containment tents, or windscreens would be applied, if needed, as determined by the Radiological Control organization. Soil removed during excavation activities would be covered until replaced into the excavation or otherwise dispositioned.

5. After leveling, the soil surface radiological contamination levels would be verified to be acceptable per Radiological Control organization guidelines. If contamination is present above identified levels, the soil would be removed and containerized for disposal or covered or fixed to provide containment of the contamination, consistent with radiological work procedures in effect at the time.

6. As appropriate, before starting deactivation activities (such as isolating utilities and piping or dismantling the exhaust system), removable contamination in the affected area(s) would be reduced to ALARA. Measures such as decontamination solutions, expandable foam, fixatives, or glovebags also could be used to help reduce the spread of contamination.

7. If a guzzler, PTRAEU, or HEPA filtered vacuum radioactive air emission unit is used, controls as described in the sitewide guzzler NOC, DOE/RL-96-75 or DOE/RL-97-50, as amended, would be followed.

8. If field surveys during excavation identify localized areas of contamination greater than the gross levels described in Section 10.0 (i.e., 500 dpm/100 cm^2 alpha), additional surveys would be conducted on the perimeter of the identified area to verify the localized nature, ensuring that the overall assumed contamination level was not exceeded.

9. Appropriate controls identified in a monitoring plan supporting de-energization of the 296-Z-14 Stack would be in place when the ventilation system is shut down.

7.0 DRAWINGS OF CONTROLS

Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

Figure 3 shows the existing ventilation system for the 232-Z Building Stack (296-Z-14) described in Section 6.0. Figure 5 shows the existing monitoring system for the 232-Z Building Stack (296-Z-14) described in Section 6.0.

The categorical NOCs for sitewide use of the guzzler, PTRAEU and HEPA filtered vacuum radioactive air emission unit contain drawings of controls associated with those respective units.

8.0 RADIONUCLIDES OF CONCERN

Identify each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI.

The radionuclides of concern are plutonium-238, plutonium-239/240 (representing alpha contamination), plutonium-241, plutonium-242, uranium-235, americium-241, and neptunium-237, which provide the basis for calculations.

9.0 MONITORING

Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with sufficient detail to demonstrate compliance with the applicable requirements.

Monitoring may be conducted during deactivation activities and after de-energization of the ventilation system.

9.1 DEACTIVATION MONITORING

Though not in full compliance with N13.1-1999, the record sampler for the 296-Z-14 Stack is operated continuously, and the resultant particulate sample air filters are collected biweekly. At a minimum, four samples are selected (minimum of one sample per calendar quarter) and analyzed for gross alpha/beta activity to verify low emissions. The emissions during the proposed activities will be represented by these samples.

As described in Section 5.1, considerable work activity was conducted in the mid-1990s with the existing system in place (monitoring/sampling as a minor point source). Adequacy of the sampling system is demonstrated by inspection, calibration, and maintenance activities as scheduled in current 232-Z Building procedures.

EPA and WDOH approval of an alternate monitoring approach has been requested. The alternate monitoring request is to continue to use the existing sampling system and to report releases based on the maximum design flow rate (3,000 CFM) rather than increasing the periodic measurements during periods of flow change. This approach will result in very conservative estimates of annual emissions.

Radiological surveys (dose measurements and smear samples) taken during deactivation activities would be performed to demonstrate the conservative nature of the estimated source term. These surveys are part of the existing radiological control program.

Diffuse/fugitive emissions would be monitored using the 200 West Area near-field ambient air monitors (PNNL-13910). Sample collection and analysis would follow that of the near-field monitoring program. Analytical results would be reported in an annual air emissions report.

If a sitewide guzzler, PTRAEU, or HEPA filtered vacuum radioactive air emission unit is used, PCM for emissions from those units would be performed as required by the guzzler NOC, DOE/RL-96-75 and DOE/RL-97-50, as amended, respectively.

9.2 DE-ENERGIZATION MONITORING

After deactivation activities have been completed, the stack emissions sampling system would be de-energized. A monitoring plan, if applicable, may be prepared identifying specific monitoring requirements based on final characterization and end state of the structure. The monitoring plan would be submitted to WDOH for review before shut down of the 296-Z-14 Stack.

10.0 ANNUAL POSSESSION QUANTITY

Indicate the annual possession quantity for each radionuclide.

The annual possession quantity (APQ) for the purpose of this NOC is 2,700 grams of material present in the building in gloveboxes, ductwork, filter boxes, and the scrubber cell. The material is a mixture of plutonium-238, plutonium-239/240, plutonium-241, plutonium-242, uranium-235, americium-241, and neptunium-237. The APQ is shown in Table 1.

It is assumed that 20 grams (approximately) of plutonium-239/240 (1.5 curies) are considered to be present as fixed contamination painted over on the walls and floors of the structure. Contaminated soil might contain 0.01 curie of transuranic contamination represented by plutonium-239/240. Only the fixed contamination is assumed to remain after deactivation activities are complete. That is, approximately 1.5 curies of plutonium-239/240 would be associated with the facility after de-energization of the 232-Z Building ventilation system.

11.0 PHYSICAL FORM

Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.

The physical form of the radionuclides in 232-Z Building is agglomerated and particulate solid. The physical form of the radionuclides associated with excavation is particulate solid.

12.0 RELEASE FORM

Indicate the release form of each radionuclide in inventory: Particulate solids, vapor or gas. Give the chemical form and ICRP 30 solubility class, if known.

The release form of the radionuclides during deactivation is solid and particulate solid. Residual radiological contamination is present in gloveboxes, ductwork, filter boxes, and the scrubber cell. Some material is assumed to be highly agglomerated and adherent to the walls of the host structure. This assumption is supported by previous work performed on similar ductwork/piping at the 232-Z Building at PFP. Plutonium materials removed from the existing ducts/piping for (or to support) remediation work have demonstrated that the material is not readily available as it is a solid material (HNF-1974, Revision 0, *Hanford Site Radionuclide National Emission Standards for Hazardous Air Pollutants Stack Source Assessment*). It is assumed that during deactivation activities, particulate matter also could be encountered.

The bulk of the internal surfaces of the 232-Z Building have been painted, resulting in predominantly fixed radiological contamination on the walls and floor of the structure. Material present at the time of de-energization is assumed to be particulate solid. External contamination (i.e., contaminated soil) is assumed to be particulate solid.

13.0 RELEASE RATES

Give the predicted release rates without any emissions control equipment (potential to emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section. Indicate whether the emission unit is operating in a batch or continuous mode.

Release rates are based on conservative assumptions regarding materials removed from the building and release monitoring data during deactivation activities conducted under DOE/RL-2002-64, Revision 1. The potential-to-emit (PTE) was calculated via method (b) in the Washington Administrative Code (WAC) [WAC 246-247-030(21)(b)]. Unabated and abated emission rates are provided in Table 2.

The proposed modification would be considered continuous operation in accordance with WAC 246-247-110(13)(b).

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Identify the MEI by distance and direction from the emission unit.

The maximum public receptor (MPR) was assumed to be a non-DOE worker who works within the Hanford Site boundary and who eats food grown regionally. The MPR was assumed to be located at the Laser Interferometer Gravitational Wave Observatory (LIGO) (Figure 1). LIGO is approximately 22,000 meters southeast from PFP.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Calculate the TEDE to the MEI using an approved procedure. For each radionuclide identified in sub section (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any existing controls using the release rates from subsection 13 of this section. Provide all input data used in the calculations.

The CAP88PC computer code (Parks 1992) was used to model atmospheric releases using Hanford-specific parameters. The MPR was assumed to be located at LIGO. Using those calculated unit dose conversion factors, the estimated potential TEDE to the MEI resulting from the conservative release rates associated with unabated emissions from deactivation of the 232-Z Building is 7.6 millirem per year (refer to Table 2). The calculated abated TEDE is 2.2 E-02 millirem per year (Table 2).

The TEDE from all 2002 Hanford Site air emissions (point sources, diffuse, and fugitive sources) was 0.066 millirem (DOE/RL-2003-19). The emissions resulting from the deactivation of the 232-Z Building, in conjunction with other operations on the Hanford Site, would not result in a violation of the National Emission Standard of 10 millirem per year (40 CFR 61, Subpart H).

16.0 COST FACTORS OF CONTROL TECHNOLOGY COMPONENTS

Provide cost factors for construction, operation and maintenance of the proposed control technology components and the system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

Cost factor inclusion is not applicable. The proposed activity is an insignificant modification to an existing facility, using HEPA filtration for radiological control technology.

16.1 DEACTIVATION

The existing ventilation system, which will remain operational during deactivation activities, uses HEPA filtration, which is recognized as ALARACT.

16.2 DE-ENERGIZATION

Based on final characterization and end state of the structure, an ALARACT demonstration, if applicable, may be prepared and submitted to WDOH for review before permanent shut down of the 296-Z-14 Stack.

17.0 DURATION OR LIFETIME

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

Deactivation activities are scheduled to take place between January 2003 and December 2006, but may extend to 2010.

18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit described in this application:

ASME/ANSI AG-1, ASME/ANSI N509, ASME/ANSI N510, ANSI/ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1

For each standard not so indicated, give reasons to support adequacy of the design and operation of the emission unit as proposed.

The abatement control system for the 232-Z Building stack (296-Z-14) was installed before this requirement for control technology standards was specified in WAC 246-247 (April 1994). Although the listed technology standards, if available at time of construction, might have been followed as guidance, there was no regulatory requirement for compliance with the listed standards.

Per WAC 246-247-130, App. C, "*The ALARACT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI. If the potential-to-emit is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation.*"

The 232-Z Building was built to the standards applicable at the time of construction. Adequacy of the design is supported by operational history, maintenance, inspections, and testing, which demonstrate that the intent of the substantive standard is met, as described in the following. In lieu of strict compliance with the current listed standards, or a list of the standards to which the ventilation system actually was designed and built, the 232-Z Building relies on a case-by-case approach so far as meeting the aforementioned substantive standards.

Operational history, routine maintenance, testing, and inspections demonstrate adequacy of the design and operation of the existing abatement control technology as proposed. The radionuclide air emissions from the 296-Z-14 Stack were reported (2001 reporting year) to be 3.4 E-08 curies total alpha and 7.7 E-08 curies total beta (HNF-EP-0527).

18.1 COMPLIANCE WITH AS LOW AS REASONABLY ACHIEVABLE CONTROL TECHNOLOGY STANDARDS

The following description of technology standards applicability and the demonstrated operational effectiveness of the 232-Z Building abatement equipment is provided to support adequacy of design and operation of this emission unit, on a case-by-case approach for meeting the substantive standards, as proposed.

- <u>ASME/ANSI AG-1 (first promulgated in 1985, and revised in 1991, 1994, and 1997):</u>

Current design and operational requirements for nuclear air treatment systems are contained in the American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI) AG-1 *Code on Nuclear Air and Gas Treatment.*

ASME/ANSI AG-1 has replaced ASME/ANSI N509-1989, *Nuclear Power Plant Air-Cleaning Units and Components* (previous versions were issued in 1980 and 1976), but ASME/ANSI N510-1989, *Testing of Nuclear Air Treatment Systems* (previous versions were issued in 1980 and 1975), remains in force. Recognizing not all systems were built to N509-1989 requirements, N510-1989 allows applicable code sections to be used as technical guidance in the development of filter testing programs on air treatment systems designed according to other criteria.

The section in AG-1 (Section FC) that covers HEPA filters is applicable to replacement filters for the 232-Z Building ventilation system. Replacement filters (HNF-S-0552, *Specification for Procurement and Onsite Storage of Nuclear Grade High-Efficiency Particulate Air (HEPA) Filters*) are nuclear grade HEPA filters that meet all but the AG-1 requirement dealing with filter qualification testing. Justification for this sitewide exception was discussed with WDOH at the December 1998 Routine Technical Assistance Meeting and was approved by WDOH. A WDOH-approved temporary deviation is currently in place to satisfy this issue (AIR 99-507).

Original filters met Hanford Works Standard (HWS-7511-S), *Standard Specification for Wood Frame High-Efficiency Particulate Air Filters*, which covered fire resistance, moisture resistance, filter efficiency (penetration), flow resistance, and filter frame integrity. The most recently installed filters, replaced in calendar year 1995, met criteria in N509, Section 5.1 and military specifications MIL 51068 and 51079. These filters have been leak tested annually since that time and applicable records are available upon request.

The current 232-Z Building exhaust system was built in 1990, and included specifications for the fans, dampers, welding requirements, HEPA filters, ductwork, and acceptance procedures. Some sections in AG-1 are not applicable, e.g., adsorbers or moisture separators. Other sections are addressed by operational adequacy, as the system has been operating for many years and has been providing the necessary flow rate and pressure to support operations [operational adequacy has been verified by low emissions as documented in annual monitoring reports (HNF-EP-0527)].

- <u>ASME/ANSI N509 (first promulgated in 1976, and revised in 1980 and 1989)</u>:

Adequacy of the HEPA filters and housings has been demonstrated by operational history and successful testing in accordance with guidance provided in ANSI N509. The existing system successfully has been tested annually in its current configuration since before April 1994 (implementation of technology standards requirements in WAC-246-247).

- <u>ASME/ANSI N510 (first promulgated in 1975, and revised in 1980 and 1989)</u>:

As allowed in ANSI N510, certain sections of ANSI N510 can be used as technical guidance for non-N509 systems. To demonstrate the adequacy of the system design and operation, the final stage HEPA filters are aerosol-tested in-place annually (to a minimum criterion of 99.95 percent installed efficiency) to meet the intent of ANSI N510. This annual testing includes a visual inspection of the housing as described in ANSI N510.

- <u>ANSI/ASME NQA-1 (first promulgated in 1985)</u>:

Quality assurance for sampling of emissions and subsequent analysis is addressed in HNF-0528, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions* (all of Sections 2.0, 3.0 and 5.0), which was written in accordance with applicable NQA-1 requirements.

- <u>40 CFR 60, Appendix A</u>:

Not applicable. Alternative stack flow testing procedures are being pursued (refer to Section 9.1).

- ANSI N13.1:

The sampling system for the 232-Z Building stack (296-Z-14) meets ANSI N13.1-1969 criteria. Because the stack would be shut down on completion of activities in this NOC, there are no plans to upgrade the airborne effluent sampling system to the ANSI N13.1-1999 criteria.

Adequacy of the sampling system is demonstrated by inspection, calibration, and maintenance activities as scheduled in current 232-Z Building procedures.

18.2 ENVIRONMENTAL, ENERGY, AND ECONOMIC IMPACTS OF AS LOW AS REASONABLY ACHIEVABLE CONTROL TECHNOLOGY

A replacement system that is fully compliant with the ALARACT technology standards and the existing HEPA filtration system (both use HEPA filtration, which already has been accepted as ALARACT to control particulates) have been evaluated and compared for environmental impacts. The existing system would allow completion of the work described in this NOC, with the TEDE to the MEI as described in Section 15.0 and Table 1, for the period described in Section 17.0. The fully compliant replacement system would have those same impacts, plus the additional potential dose impacts (TEDE to MEI from existing source term in the 232-Z Building that would be removed with this NOC) from allowing the 232-Z Building radiological inventory to remain in place for several additional years. It could take years to fund (congressional approval needed), design, permit, procure, and install a replacement system that is fully compliant with the ALARACT technology standards. Completion of the work described in this NOC would reduce potential TEDE to the MEI, as source term is removed from the 232-Z Building. The work described in this NOC is needed whether relying on the existing system or relying on a fully compliant replacement system. The potential exposure to the public from a 5-year delay is an adverse environmental impact of a fully compliant replacement system. There are additional adverse impacts from installation of a fully compliant replacement system, e.g., waste generation (radioactive and nonradioactive, air and non-air), disposal and stabilization, construction of control equipment, and the health and safety to both radiation workers and to the general public.

The existing system and a fully compliant replacement system have been evaluated for energy impacts. The existing energy distribution system would be used for either option, so there are no energy impacts to consider for this ALARACT compliance evaluation.

The existing system and a fully compliant replacement system have been evaluated for economic impacts. There would be no improved reduction in TEDE to the MEI for the replacement system as compared to the existing system, because both are effectively equal (minimum removal efficiency for particulates of 99.95 percent); therefore, the beneficial impact is zero.

The work described in this NOC involves a reduction in inventory at the 232-Z Building, and thereby reduces the risk to the public. Installing a fully compliant system for the deactivation activities would delay the inventory reduction work, and thereby delay this risk reduction. A fully compliant system would reduce the risk associated with the work described in this NOC, but would introduce greater additional risk because of delaying the cleanout work while transitioning to a fully compliant system. The most reasonable approach would be to use the existing system for this NOC to expedite removal of the radiological inventory from the 232-Z Building.

Further, the anticipated inventory of material remaining after deactivation (i.e., after removal of more than 1,000 curies of material with less than 2 curies remaining) represents minimal risk to the public after de-energization. This residual contamination is painted over and not readily dispersible.

Pursuant to WAC 246-247, Appendix B, the most effective technology (i.e., a fully compliant replacement system) could be eliminated from consideration if a demonstration can be made to WDOH that the technology has unacceptable impacts. Because a fully compliant replacement system is not justified by cost/benefit evaluation or adverse environmental impacts because of delaying the work described in this NOC, it is proposed that the existing system, as described in Section 6.0 and meeting the intent of the technology standards in Section 18.1 of this NOC, be accepted as compliant with the ALARACT technology standards.

19.0 REFERENCES

AIR 99-507, Letter, Allen W. Conklin, WDOH, to James E. Rasmussen, DOE-RL, May 19, 1999, State of Washington, Department of Health, Olympia, Washington.

AIR 03-902, Letter, Allen W. Conklin, WDOH, to Joel B. Hebdon and James E. Rasmussen, DOE-RL, September 3, 2003, State of Washington, Department of Health, Olympia, Washington.

DOE/RL-96-75 Rev. 2, *Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emissions Units,* September 1999, U.S. Department of Energy, Richland Washington.

DOE/RL-97-50 Rev.1, *Radioactive Air Emissions Notice of Construction for HEPA Filtered Vacuum Radioactive Air Emission Units,* September 1999, U.S. Department of Energy, Richland Washington.

DOE/RL-2003-19, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002,* June 2003, U.S. Department of Energy, Richland, Washington.

DOE/RL-2002-64, *Radioactive Air Emissions Notice of Construction for Transition of the 232-Z Contaminated Waste Recovery Process Facility at the Plutonium Finishing Plant, 200 West Area, Hanford Site, Richland, Washington,* Revision 0, November 2002, U.S. Department of Energy, Richland, Washington.

DOE/RL-2002-64, *Radioactive Air Emissions Notice of Construction for Transition of the 232-Z Contaminated Waste Recovery Process Facility at the Plutonium Finishing Plant, 200 West Area, Hanford Site, Richland, Washington,* Revision 1, April 2003, U.S. Department of Energy, Richland, Washington.

FFCA, 1994, *Federal Facility Compliance Agreement for Radionuclide NESHAP*, February 7, 1994, U.S. Environmental Protection Agency, Region 10 and U.S. Department of Energy, Richland Operations Office, Richland, Washington.

HNF-0528, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions*, Fluor Hanford, Richland, Washington, updated periodically.

HNF-1974, Revision 0, *Hanford Site Radionuclide National Emission Standards for Hazardous Air Pollutants Stack Source Assessment*, Fluor Hanford, Richland, Washington.

HNF-3602, Revision 1, *Calculating Potential-to-Emit Releases and Doses for FEMPs and NOCs*, January 2002, Fluor Hanford, Richland, Washington.

HNF-EP-0527, Revision 11, *Environmental Releases for Calendar Year 2001*, August 2002, Fluor Hanford, Richland, Washington.

HNF-S-0552, *Specification for Procurement and Onsite Storage of Nuclear Grade High Efficiency Particulate Air (HEPA) Filters*, Revision 2, June 7, 2000, Fluor Hanford, Richland, Washington.

Parks, B. S., *User's Guide for CAP88-PC Version 1.0*, 402-B-92-001, 1992, U.S. Environmental Protection Agency, Washington, D.C.

PNNL-13910. Appendix 2, *Hanford Site Near-Facility Environmental Monitoring Data Report for Calendar Year 2001*, September 2002, Pacific Northwest National Laboratory, Richland, Washington.

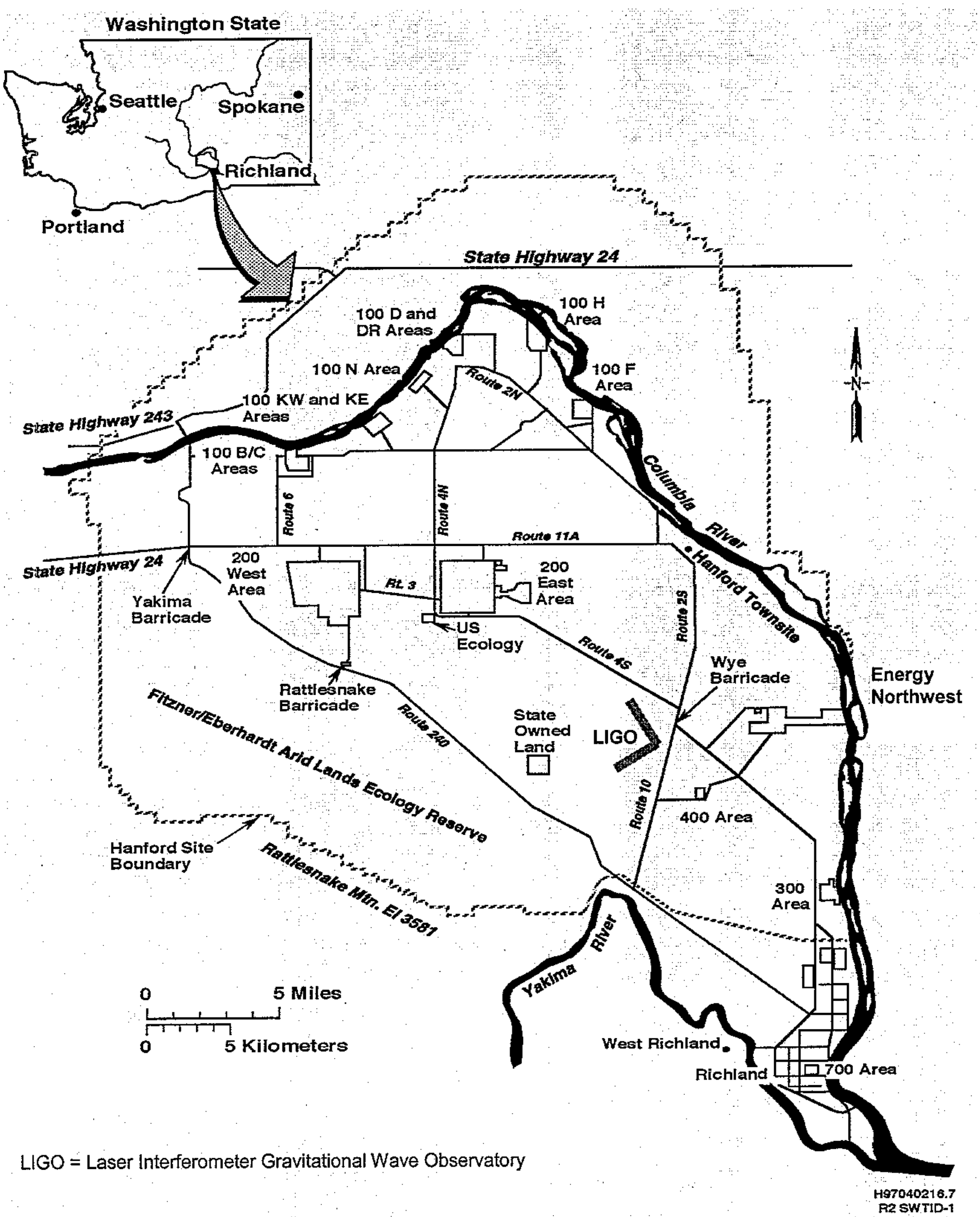
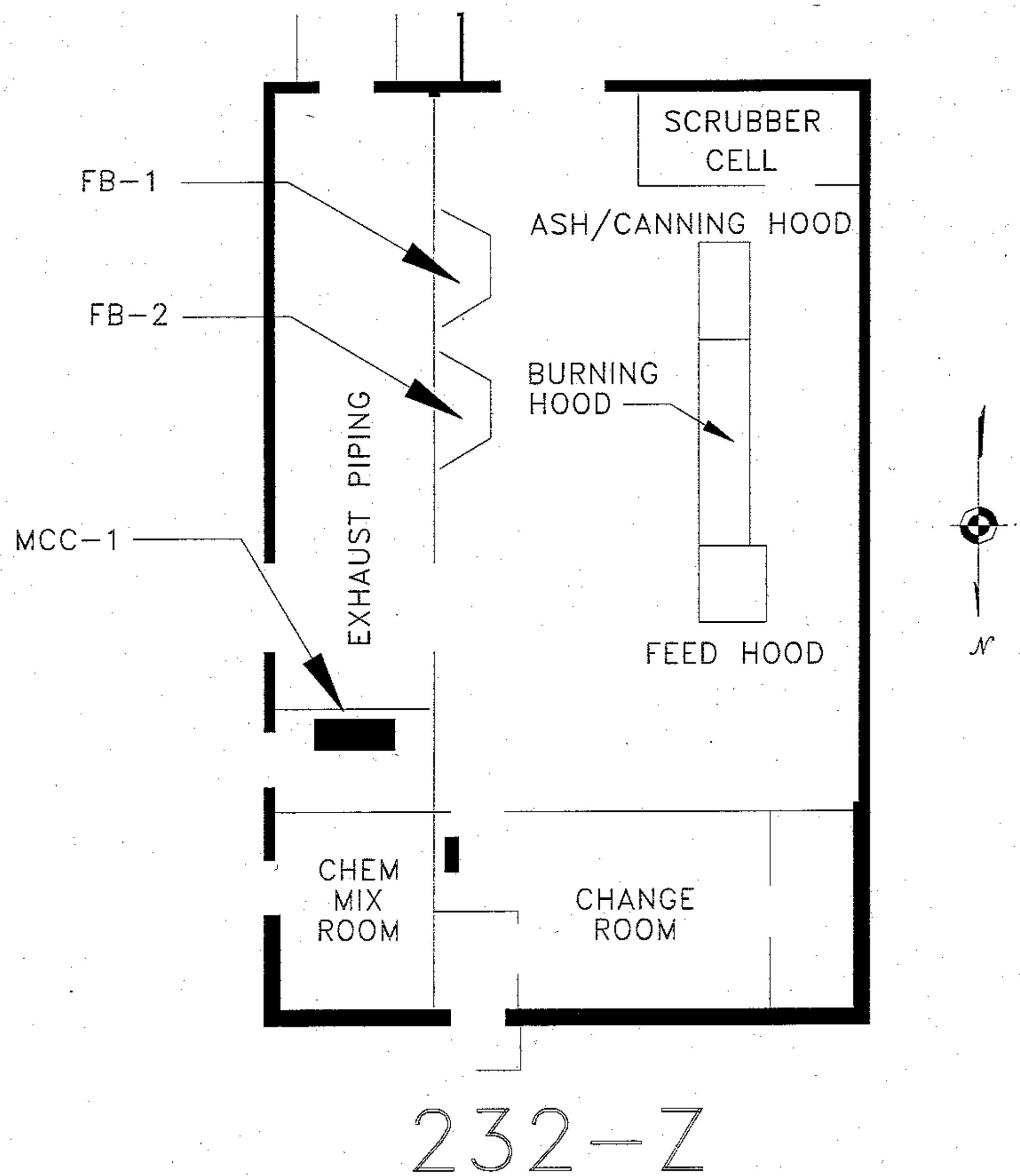


Figure 1. Hanford Site.



FB = filter box
MCC = Motor Control Center

Figure 2. Floor Plan of the 232-Z Building.

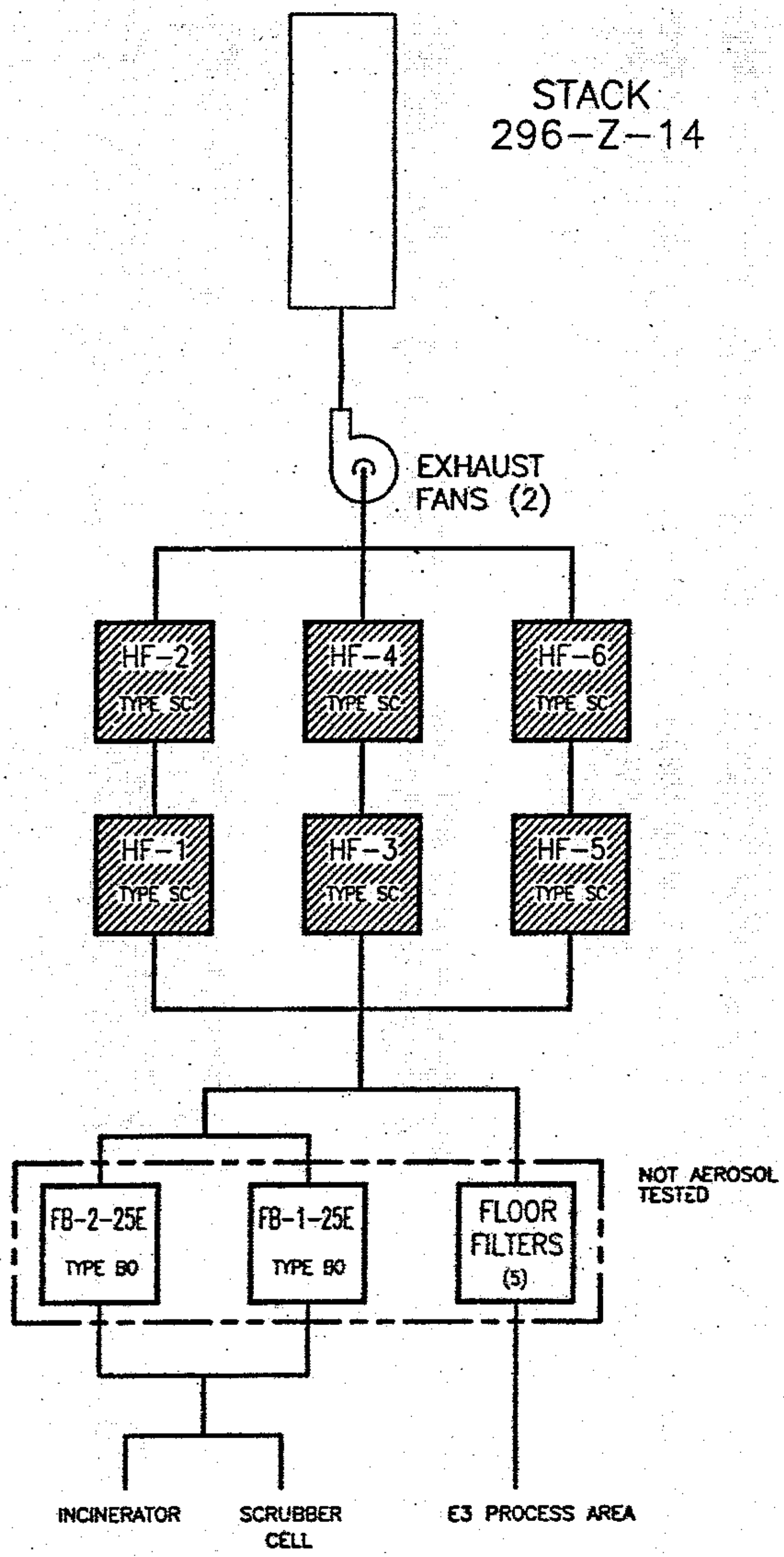


Figure 3. Existing Ventilation System for the 232-Z Building.

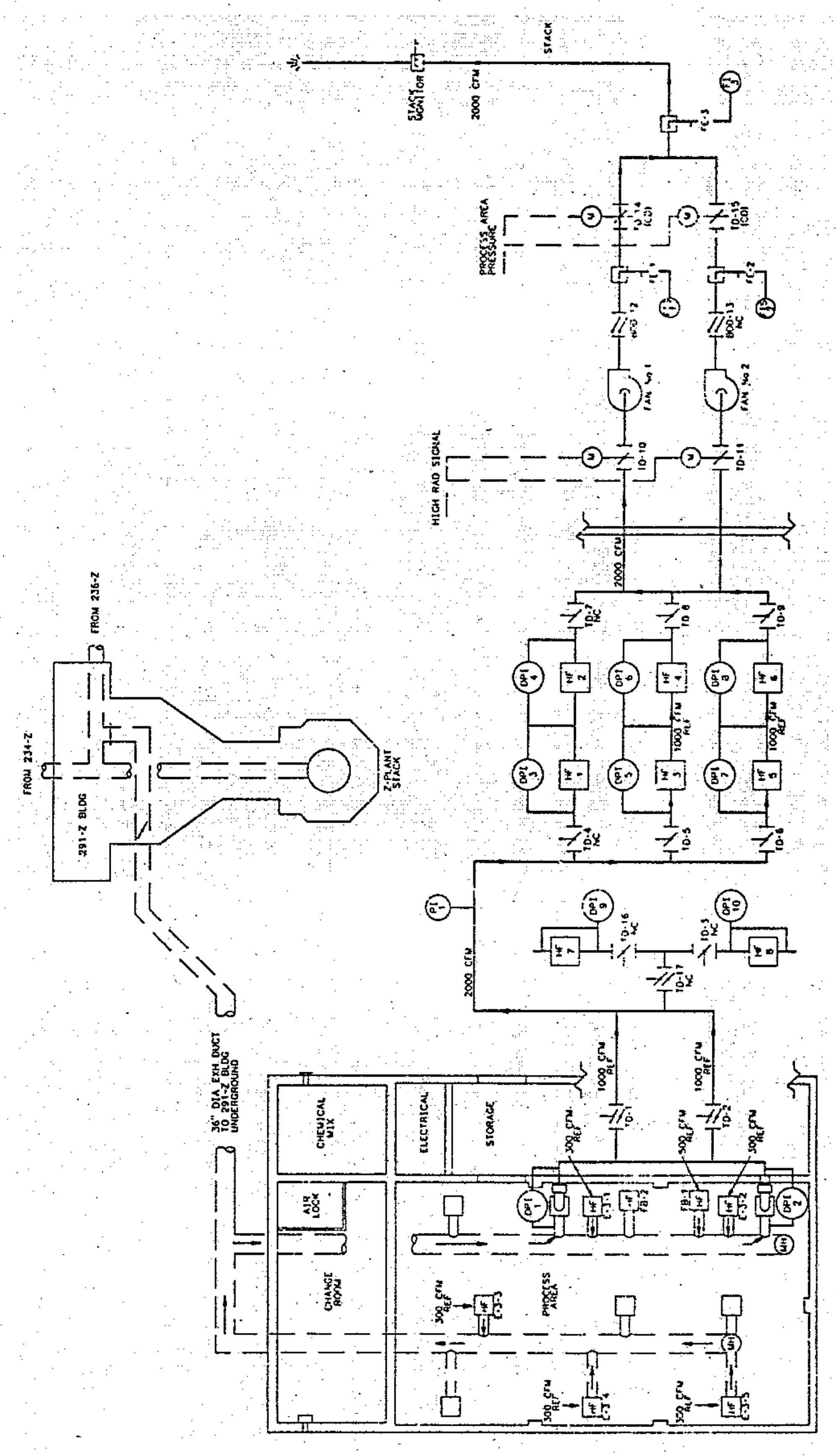


Figure 4. 232-Z Ventilation System Showing Inactive Portion in 291-Z Building.

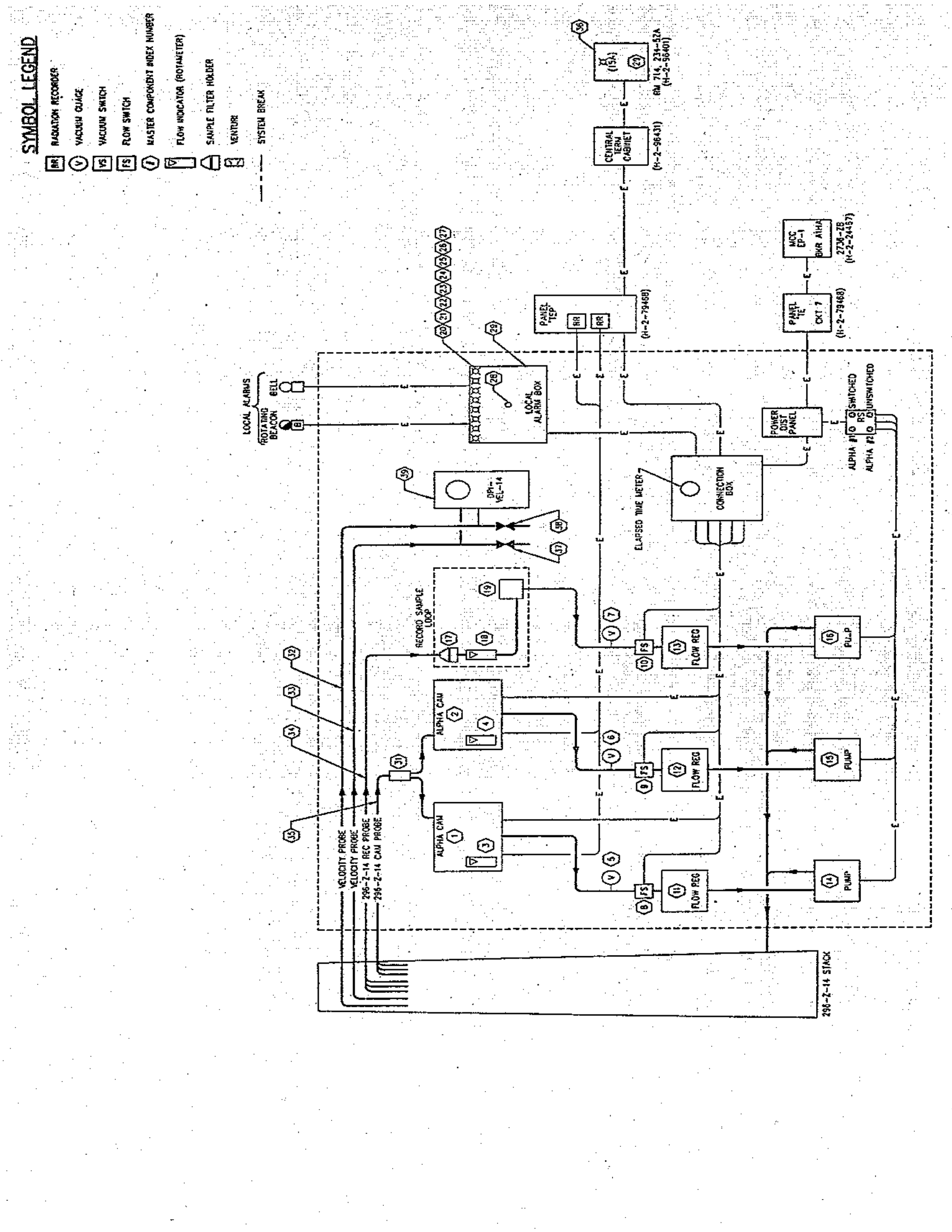


Figure 5. Existing Monitoring System for the 291-Z-14 Stack.

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Table 1. 232-Z Annual Possession Quantity.

Radionuclide	APQ (curies)	APQ (grams)
Pu-238	1.3 E+01	7.8 E-01
Pu-239	1.5 E+02	2.4 E+03
Pu-240	4.8 E+01	2.1 E+02
Pu-241	5.9 E+02	5.7 E+00
Pu-242	4.2 E-03	1.4 E+00
Am-241	7.6 E+01	2.2 E+01
Np-237	8.5 E-04	1.2 E+00
U-235 [c]	1.1 E-05	5.2 E+00
Total	**~8.8 E+00**	**~2,700**

Table 2. 232-Z Building Deactivation Release Rates and Dose Estimates.
(Assumed isotopic mixture for conservative calculations of potential-to-emit.)

Radionuclide	Isotopics (weight %)	Alpha /Beta	% of Alpha Activity Contribution	Assumed Isotopic release, curies total Alpha[a]	Assumed Isotopic release, curies total Beta[b]	Release factor	Unabated release (Ci)	Unit dose factor[e]	Unabated TEDE (millirem per year)	Abated TEDE[f] (millirem per year)
Pu-238	0.03	Alpha	5.0 E+00	2.8 E-02		N/A	2.8 E-02	10	2.8E-01	1.4E-04
Pu-239	91.5	Alpha	5.5 E+01	3.1 E-01		N/A	3.1 E-01	11	3.4E+00	1.7E-03
Pu-240	8.23	Alpha	1.8 E+01	1.0 E-01		N/A	1.0 E-01	11	1.1E+00	5.6E-04
Pu-241	0.19	Beta	0.0 E+00	0.0 E+00	1.1 E+00	N/A	1.1 E+00	0.16	1.8E-01	9.0E-05
Pu-242	0.05	Alpha	1.0 E-03	8.1 E-06		N/A	8.1 E-06	10	8.1E-05	4.0E-08
Am-241	0.83	Alpha	2.7 E+01	1.5 E-01		N/A	1.5 E-01	17	2.6E+00	1.3E-03
Np-237	0.04	Alpha	3.0 E-04	1.5 E-06		N/A	1.5 E-06	16	2.5E-05	1.2E-08
U-235[c]	0.2	Alpha	4.0 E-06	2.4 E-08		N/A	2.4 E-08	4	9.5E-08	4.7E-11
Stack Emissions Summary				5.9 E-01	1.1 E+00		1.7E+00		7.5E+00	3.8E-03
Diffuse and Fugitive Emissions										
Pu-239/240[d] (denergization)		Alpha		1.5 E+00		1.0 E-03	1.5 E-03	11	1.7 E-02	1.7E-02
Pu-239/240 (excavation)		Alpha		1.0 E-02		1.0 E-03	1.0 E-05	11	1.1E-03	1.1E-03
D/F Summary				1.5 E+00			1.5 E-03		1.8 E-02	1.8E-02
Total									**7.6E+00**	**2.2E-02**

[a] Based on 0.56 curies alpha; rounded values.
[b] Based on 1.12 curies beta; rounded values.
[c] U-235 present but very small quantity; assume 0.20 weight percent total plutonium for conservatism and completeness.
[d] 1.5 curies Pu-239/240 assumed to remain after deactivation; for conservatism, assumed to be dispersible as particulate solid. Assume 100 percent Pu-239 for calculation.
[e] HNF-3602, Revision 1, *Calculating Potential-to-Emit Releases and Doses for FEMPs and NOCs*. For conservatism, Table 4-10: Pu-239, effective release height <40 meters, onsite MPR.
[f] Credit taken for one stage of testable HEPA filters (unabated times 0.0005).

Enclosure 2

NOTICE OF OFF-PERMIT CHANGE FOR THE HANFORD SITE AIR OPERATING PERMIT (AOP) (NUMBER 00-05-006) FOR RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION (NOC), DOE/RL-2004-64, REVISION 2, TRANSITION OF THE 232-Z CONTAMINATED WASTE RECOVERY PROCESS FACILITY AT THE PLUTONIUM FINISHING PLANT, 200 WEST AREA, HANFORD SITE, RICHLAND, WASHINGTON

HANFORD SITE AIR OPERATING PERMIT

Notification of Off-Permit Change

Permit Number: 00-05-006

This notification is provided to Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as notice of an off-permit change described as follows.

This change is allowed pursuant to WAC 173-401-724(1) as: 1. Change is not specifically addressed or prohibited by the permit terms and conditions 2. Change does not weaken the enforceability of the existing permit conditions 3. Change is not a Title I modification or a change subject to the acid rain requirements under Title IV of the FCAA 4. Change meets all applicable requirements and does not violate an existing permit term or condition 5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Provide the following information pursuant to WAC-173-401-724(3):

Description of the change:	
A Radioactive Air Emissions Notice of Construction, *Radioactive Air Emissions Notice of Construction for Transition of the 232-Z Contaminated Waste Recovery Process Facility at the Plutonium Finishing Plant, 200 West Area, Hanford Site, Richland, Washington* (DOE/RL-2002-64, Revision 2), is being submitted to the Washington Department of Health (Health) for approval and the U.S. Environmental Protection Agency (EPA) for information. A change in the Hanford Site Air Operating Permit is required to indicate this source of air emissions.	
Date of Change:	
Effective date will be the approval by DOH of the NOC.	
Describe the emissions resulting from the change:	
Radioactive air emissions with the total estimated unabated and abated TEDE to the hypothetical MEI are 7.6 E+00 and 2.2 E-02 millirem per year, respectively.	
Describe the new applicable requirements that will apply as a result of the change:	
Applicable requirements will be identified in approval notification by Health.	
For Hanford Use Only:	
AOP Change Control Number:	Date Submitted: